REMARKS

Claims 1-4 were previously pending in this application. Claim 1 has been cancelled and rewritten as new claim 5. Claims 2-4 have been amended to clarify the claims and correct their dependencies. Claims 5-12 have been added. As a result, claims 2-12 are pending for examination with claims 5, 9, and 12 being independent claims.

Support for new independent claims 5 and 9 can be found in paragraphs 0008-0018 of the application specification. Support for new independent claim 12 can be found in paragraphs 0006-0018 of the application specification. Support for new claims 6, 7, 10, and 11, can be found in paragraphs 0013-0021 of the application specification. Support for new claim 8 can be found in paragraphs 0009-0018 of the application specification. No new matter has been added.

Rejections Under 35 U.S.C. §103

Claims 1-3 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 4,767,539 to Ford (hereinafter "Ford") in view of NL 1021197 (hereinafter "Van Hoof").

Claim 4 was rejected under 35 U.S.C. §103(a) as being unpatentable over Ford in view of Van Hoof, and further in view of U.S. Patent No. 6,202,475 to Selbie et al. (hereinafter "Selbie").

Claims 5 (previously claim 1), 2, and 3 would not have been obvious over Ford in view of Van Hoof because one of ordinary skill in the art would not have been motivated to combine the references in the manner suggested to arrive at the present invention. Claim 4 would not have been obvious over Ford in view of Van Hoof and further in view of Siebel for at least the same reasons that claim 5 would not have been obvious.

Ford is directed to a method of cleaning filters made from hollow fibers (Col. 1, lines 10-11). Ford discloses a method of back-washing hollow fiber filters (Col. 1, lines 66-68) by using a high pressure gas back-wash (Col. 2, line 42) which produces explosive decompression of the gas through the membrane structure (Col. 2, lines 62-63). As acknowledged by the Examiner on page 3 of the Office Action, Ford does not disclose a method of testing the integrity of a membrane. Further, Ford fails to disclose a method comprising backwashing a membrane by applying a gas at a pressure below the bubble point to liquid permeate within the membrane lumen.

Van Hoof is directed to a method of measuring the integrity of a filter membrane consisting of removing fluid from the feed side of the membrane, supplying gas to the filtrate side of the membrane, increasing the gas pressure on the feed side to above the pressure on the filtrate side, and comparing the change in pressure on the filtrate side with a reference value. (Detailed Description on page 2 Derwent translation). Van Hoof does not disclose backwashing a membrane with a gas with one side of the membrane exposed to liquid, nor does Van Hoof disclose backwashing a membrane by applying a gas at a pressure below the bubble point to liquid permeate within the membrane lumen.

Selbie is directed to a method of predicting Logarithmic Reduction Values in filtration systems and the use of such values for the control and monitoring of operating filtration systems. (Col. 1, lines 6-9). Selbie also discloses a method of testing the integrity of a porous membrane. (Col 1, lines 46-58). Selbie fails to disclose backwashing of a membrane by applying a gas at a pressure below the bubble point to a liquid permeate within the membrane lumen.

Claim 5 is directed to a method of integrity testing a permeable hollow fiber membrane immersed in a liquid suspension. The method comprises backwashing the membrane by applying a gas at a pressure below a bubble point to a liquid permeate within a membrane lumen, allowing a gas pressure in the lumen of the membrane to increase to a predetermined level above a pressure on another side of the membrane, isolating the lumen of the membrane, measuring a reduction in gas pressure within the lumen of the membrane, and comparing the measured reduction in pressure against a predetermined value.

No *prima facie* case of obviousness of claim 5 over Ford in view of Van Hoof can be made because the two references cannot be validly combined. In fact, someone of ordinary skill in the art would have recognized that the references would have taught away from one another. Ford and Van Hoof could not have been combined in a way that would provide a reasonable expectation of success of the methods disclosed in either. Further, no alleged combination of Ford and Van Hoof would have taught all of the elements recited in claim 5.

Ford relies on a method of providing a high pressure gas backwash through fibrous membranes into a liquid in order to clean the membranes. Van Hoof relies on creating a pressure differential between gasses on two sides of a membrane in order to measure the membrane integrity. Ford requires a membrane with gas on one side and liquid on the other in order for the disclosed method to function. In contrast, Van Hoof requires gas on both sides of a membrane in

order for his method to function. The method of Ford would be inoperable if modified to incorporate the teaching of Van Hoof to include a membrane with gas on both sides; conversely, the method of Van Hoof would also be inoperable if combined with the disclosure of Ford to include exposing a membrane to gas on one side and liquid on the other. The references thus teach away from each other. Because the technique disclosed by Ford requires fluids with different phases and the techniques disclosed by Van Hoof requires fluids of the same phase, any combination thereof would render the respective teachings inoperable. Any combination of Ford with Van Hoof would result in a non-functional method. Thus, the methods disclosed in these references would not have been combined by one of ordinary skill in the art.

Further, neither Ford nor Van Hoof disclose, teach, or suggest a method as recited in claim 5 which comprises a step of backwashing a membrane by applying a gas at a pressure below the bubble point to a liquid permeate within a membrane. The Examiner seems to state that Ford discloses such a step when he writes on page 3 of the Office Action in reference to the disclosure of Ford that "[i]n order for the gas to permeate through the membrane filter, it is understood that the pressure would have to be below the bubble point." Applicants respectfully disagree that this statement is correct. In fact, the opposite is true. At pressures below the bubble point, gas passes across a filter membrane only by diffusion. At pressures above the bubble point bulk flow of air through the membrane pores is possible and bubbles will be seen on the liquid side. The Examiner is directed to Selbie, Col. 2, lines 7-12, which explains that the term "bubble point" is understood to those of skill in the art of membrane filtration such that "[i]f the lumens of a fully wetted membrane (i.e., all the pores are filled with liquid), are filled with air at a pressure below the bubble point, then the pores of the membrane will remain wet and there will be no significant air flow through the pores other than a relatively small flow due to diffusion." Ford relies on a gaseous backwash step carried out at a pressure sufficient to overcome the effect of surface tension of the continuous phase of feedstock within the pores of the membrane to create explosive decompression of the gas through the membrane structure. To create explosive decompression of gas through the membrane structure, the gas in the method disclosed by Ford must be supplied at a pressure above the bubble point of the membrane. Van Hoof fails to repair the deficiencies of Ford to teach the invention of claim 5 because Van Hoof also fails to disclose applying air pressure below the bubble point to a permeate within a

membrane lumen. Van Hoof instead discloses a method of testing a membrane with gas on both sides. Thus, no bubble point can even be defined in the method disclosed by Van Hoof.

Accordingly, since neither Ford nor Van Hoof disclose, teach, or suggest a step of backwashing a membrane by applying a gas at a pressure below the bubble point to a liquid permeate within a membrane lumen, any alleged combination of the two would have lacked at least one claim element recited in claim 5.

Thus, because any alleged combination of Ford and Van Hoof would have lacked at least one explicitly recited claim element and would have been inoperable to perform the method according to claim 5, one skilled in the art would not have been motivated to combine Ford and Van Hoof in the manner suggested. Therefore, no *prima facie* case of obviousness of claim 5 can be made.

Even if Ford and Van Hoof could have been validly combined, the resulting method would have been one where a fiber membrane is tested with gas on both the filtrate and feed sides of the membrane. This is patentably distinct from what is recited in claim 5, which recites performing an integrity test while a permeable, hollow membrane is immersed in a liquid suspension.

Accordingly, reconsideration and withdrawal of the rejection of claim 5 under 35 U.S.C. §103(a) as being unpatentable over Ford in view of Van Hoof is respectfully requested.

Claims 2 and 3 depend from independent claim 5 and are patentable for at least the same reasons as claim 5. Accordingly, reconsideration and withdrawal of the rejection of claims 2 and 3 under 35 U.S.C. §103(a) as being unpatentable over Ford in view of Van Hoof is respectfully requested.

Claim 4 would not be obvious because no valid combination of Ford, Van Hoof, and Siebel would have disclosed all the elements of claim 4.

Claim 4 recites the method of claim 5 wherein the predetermined value corresponds to a Logarithmic Reduction Value of 4. Nothing in Selbie overcomes the deficiencies of any combination of Ford and Van Hoof to teach claim 5 as discussed above. Thus, claim 4, which depends from claim 5, patentably distinguishes over any combination of Ford, Van Hoof, and Selbie for at least the same reasons as claim 5.

Further, Selbie does not disclose, teach, or suggest that the use of a reference value having a Logarithmic Reduction Value of any particular number, let alone a Logarithmic

Reduction Value of 4, would be either functional or desirable in a method of measuring filter membrane integrity. Thus, Selbie utterly fails to teach the elements of claim 4.

Accordingly, reconsideration and withdrawal of the rejection of claim 4 under 35 U.S.C. §103(a) as being unpatentable over Ford in view of Van Hoof and further in view of Selbie is respectfully requested.

New independent claims 9 and 12 are patentable for at least the same reasons recited above, namely one of ordinary skill in the art would not have been motivated to combine Ford and Van Hoof in the manner suggested because any alleged combination of Ford and Van Hoof would have lacked at least one explicitly recited claim element and would be inoperable to perform the method according to either of claims 9 or 12.

New dependent claims 6-8 and 10-11 depend either directly or indirectly from independent claims 9 and 12 and are patentable for at least the same reasons.

CONCLUSION

In view of the foregoing Amendments and Remarks, this application is in condition for allowance; a notice to this effect is respectfully requested. If the Examiner believes that this application is not in condition for allowance, the Examiner is requested to call Applicants' attorney at the telephone number listed below.

If this Response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicants hereby request any necessary extension of time. If there is a fee occasioned by this Response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 50/2762.

Respectfully submitted,
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